THE

VETERINARY JOURNAL

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JULY, 1928.

Editorial

THE IMPORTANCE OF UNIVERSITY STATUS FOR THE VETERINARIAN.

No one nowadays will dispute the advantage for a teaching institution, especially in the case of that of a profession, to be definitely linked up with a University, and the Veterinary profession cannot afford to be left out. Our Colonies have recognised this to a much more marked extent than we have, and the Veterinary School of the University of Melbourne in Australia was the first Colonial Veterinary Faculty ; being closely followed by the School established at Sydney. South Africa came into line in 1921, and the very fine buildings and equipment of the Veterinary Faculty of this University are practical evidence of the value set upon Veterinary Science in that country. In a further column of this issue of The Veterinary Journal we publish a list of the professors and teachers in this institution and of the regulations for the degree of Doctor of Veterinary Science. Amongst the degrees taken by the eminent gentlemen who adorn the teaching staff, we notice that no less than six have taken the Doctorate of Veterinary Medicine. For this they have our congratulations, but the fact that each one is taken at some Continental school (Berlin, Hanover and Berne respectively), although three of them are Graduates of the Royal College of Veterinary Surgeons, brings home to every Britisher (whether practising in

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England or the Colonies) very forcibly the fact that in this the English curriculum needs to be brought up to date. There is, unfortunately, at the present time (although we hope to see it remedied shortly) a gap in British Post-Graduate Veterinary Teaching which needs to be filled up, and if a British graduate wishes to gain the degree of Doctor of Veterinary Science he ought to be able to take the course of study at one or other of our British Veterinary Colleges and not be compelled to obtain the degree he wishes from some Continental school. Our Continental neighbours are far ahead of us in these things, as, indeed, they are in many others of an educational nature; and they have given us a lead which we may quite worthily follow. All the countries of Europe, and most of the States of North and South America, have their Veterinary Faculties attached as part and parcel of Universities; and it is another of the curious anomalies of this animal-loving country of Great Britain that, in the matter of giving Veterinary Science its proper Veterinary Status, it still lags so far behind.

The continuation of the article by Mr. H. Moltzen-Nielsen on "A Visit to Some of the Continental Veterinary Schools," on pages 332-342, is full of interest, as is also the one on "Veterinary Education," by Capt. Daubney, on pages 325-332. Both will give our earnest readers much food for thought and will emphasise the present need for cool deliberation in the many questions which are now being carefully considered in regard to the Rebuilding and Endowment Scheme of the Royal Veterinary College.

General Articles

VETERINARY EDUCATION.

By R. DAUBNEY, M.Sc., M.R.C.V.S.
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It is profitable at this stage to examine the developments of the last 10 years, in so far as they affect the usefulness of the veterinary profession to the community, and to consider the reactions of the profession as a whole to the changes that have taken place.

There have been two most striking changes during this period, one sudden in its incidence and developed with amazing rapidity, and the other, less noticeable, more gradual in its impact, but nevertheless of an even greater importance to the future of the veterinary profession. The mechanisation of transport is the first of these changes, the passing of the horse as an instrument of everyday commerce, with effects that have no doubt been singularly unpleasant to the former city practitioner. The second change, which fortunately for the prospects of the profession appears to be largely compensatory in effect, has been the development of preventive veterinary medicine, originating in the research laboratory and resulting in increased activity of the State in the control of diseases of animals. This movement has passed from State to Local Authority, enrolling the general practitioner within its ranks, and is at the present moment chiefly manifesting itself in an insistent demand for increasing numbers of better-equipped research workers to carry out investigations, the paramount importance of which is at last realised by both home and colonial administrations. One must feel that the passing of the horse, which afforded perhaps the most lucrative form of private practice and certainly the one which made least demand upon the scientific attainments of the veterinarian, has been a blessing in disguise to the profession in general; since it has removed from necessity of serious consideration one portion of the veterinarians' field which by reason of its age and prosperity formerly exercised an extremely strong and conservative influence upon the policy of the profession.

Turning to the more important consideration of the development of preventive medicine, the writer proposes to examine the reactions of the profession to what in practice has amounted to a fundamental change in its major field of activity. The passing of the horse enables us to focus our attention more clearly on the patients of to-day, the

common farm livestock, of which every species from the ox to the domestic fowl can be brought within the sphere of the new veterinary medicine ; since now, and in the future, it is in the protection of the herd or the flock that the veterinarian must exercise his profession, and the actual value of the individual sick animal no longer determines whether or not it is worthy of the attentions of a professional man. Formerly, the practising veterinarian was rarely consulted with reference to the ailments of fowls, or even of sheep, or pigs, and this fact was not without adverse effect upon the state of his knowledge of the diseases of those animals ; and was even reflected in a tendency to neglect the study of these diseases at educational and research institutions. It is only in recent years that there has been any marked reversal of this policy, at all events in Great Britain, and only to-day that the country practitioner is feeling any benefit from the change.

Modern policy is altogether directed towards *prevention* rather than *cure* of disease, and in this policy of prevention both State and the private practitioner are called upon to play an ever-increasing part. The usefulness of the veterinarian to the community, therefore, must rest primarily upon his ability to prevent the incidence of diseases of stock, whether infectious, nutritional, or functional in origin ; and secondly, upon his power, when outbreaks of disease do occur, to minimise losses by the application of appropriate corrective measures to the whole herd. *In pursuit of this objective, the whole-time State and Municipal Services are constantly being enlarged, the practitioner is being drawn more and more into the service of the State or Local Authority, and there is a steadily increasing demand for better equipped research workers.*

The change to what one may conveniently term State veterinary science has been gradual, and its importance has perhaps not been readily perceptible to the working professional man, but anyone with even a few years' experience of the profession cannot fail to realise that such an alteration has taken place, if he reflects a little on the conditions of to-day and those of, say, 1908. *Moreover, he will be astounded at the signal failure of his profession to keep pace with this development. It is a fact that there is to-day and has been for some time past an acute shortage of the right type of graduate for the State Services, either in the field or in the laboratory. The responsibility for this shortage is shared by Government and by the profession itself ; by Government for its failure during a long period of years to accord due recognition and assistance to veterinary services, and by the profession for its failure to make provision for the training of this type of graduate.*

With regard to the attitude of Government there is now definite

evidence that Government at last realises the vital necessity for maintaining efficient State veterinary services and the importance in that scheme of skilled research. Measures are under discussion which are designed to improve conditions and to render the services more attractive to young men of high intellectual attainments. Some of the measures that might be applied to the Colonial Services were discussed by the writer in an article in THE VETERINARY JOURNAL of November last. It is enough to state that there is ground for satisfaction in the resolutions of the Imperial Agricultural Conference and in the terms of reference of the Committee formed to investigate the problem of the veterinary services; and that there is further encouragement in the developments foreshadowed in the report of the Committee of Agricultural Services.

It is the duty of the profession to indulge in a little of that introspection of which it is apparently so fond, but to confine the study to severely practical issues. It is the purpose of this article to draw attention to the rapid movement of events connected with State activities in veterinary science and to discuss briefly the response that this progress must evoke from the profession. *At the risk of appearing tautological the writer feels impelled again to state his conviction that the most important field of the veterinarian is in preventive work directly or indirectly under public control, whether of State or Local Authority, and that the future of the profession depends directly upon its ability to adjust itself rapidly to the new conditions.*

The colleges and research institutes are passing through a period of extreme financial stringency, and appeals are being made for funds to reconstruct our oldest college, but as far as one can see, adequate financial assistance can be obtained only from the State or some similar source. In fact, in the future, educational institutions must be dependent upon the State or upon the large research foundations, since in a small profession no college can hope to be self-supporting and at the same time efficient; and appeals to the sentiments of small animal lovers are never likely to provide sufficient funds.

What are the facts with reference to this side of the veterinarian's work? So far as the provision of research workers is concerned, committee after committee appointed by Government has drawn attention to the difficulty of obtaining a supply of skilled veterinary research workers, and the shortage is emphasized by an increasing tendency to invite invasion of the veterinarian's field.

Whether an official body is appointed to inquire into the control of specific stock diseases or into matters affecting the policy of veterinary services as a whole, veterinary representation is usually a minority, and it is remarkable how consistently members of the medical and other

professions are appointed by such committees. Certain fields of research, properly the preserve of the veterinarian, particularly those in the specialised branches which tend to diverge a little from ordinary medicine, have become the happy hunting ground of astute members of other professions in search of a career. In some instances their efforts have been crowned with success, and the publicity they have acquired for their particular subject or group of subjects has not been without its value to a profession which in the near future will be dependent for its very existence upon the views held by public men of its usefulness as a State service. Publicity of any kind is an excellent tonic to a thriving healthy concern, and invasion of its field may stimulate a rising profession to renewed and more vigorous efforts, but it must stimulate and not crush. *There is danger to the profession in these successful incursions into the veterinary field, only if the profession fails to recognise the signs and make provision for the future; and that provision must be made by reconstruction of the whole system of the veterinarian's training.* There can be no disputing the statement that the veterinary curriculum of to-day does not provide adequate training for the graduate who intends to take up research work. The closer knowledge of the preliminary biological sciences which he needs must be acquired elsewhere than in lectures and laboratory courses that merely fulfil the requirements of the Royal College of Veterinary Surgeons, and it is a regrettable fact also that the syllabus requirements in the special pathology, bacteriology, and parasitology of the diseases of domesticated animals are considerably below the standard he needs. *One may go a step further and say that the training is not adequate in these respects for the graduate who enters the State service as a field-officer, either at home or in the colonies.* This view is certainly held by most senior colonial veterinary officials and probably by the Colonial Office itself.

The suggestion that is always advanced is that post-graduate courses should be arranged for all graduates who desire to enter the public services. But post-graduate courses cannot easily remedy fundamental defects in the training in preliminary sciences, nor make up for grossly inadequate laboratory courses to which some three years have been devoted. The logical remedy is to recast the whole course of training in at least one of our colleges to higher standards, with much more attention to bench-work in the laboratories. The present curriculum was undeniably designed to equip graduates as general practitioners, and any suggestion that involves the raising of standards, whether of entrance examination or professional training, at once arouses a storm of protest, the chief points of which appear to be (*a*) that since the general practitioner is in the great majority,

one must legislate always for him and never for the public health worker, (*b*) that anything tending to make the process of qualification more difficult, e.g. the raising of entrance qualifications or the lengthening of the course by one year will discourage candidates from coming forward and diminish still further the numbers of students entering the colleges. With regard to (*a*) the correct answer appears to be that one is not proposing to legislate for any numerical group minority or otherwise, but for an important field of work, with which the future of the profession is most closely linked; and that it is just as necessary for the future practitioner that his training should be modernised as it is for the State worker. There are few practitioners to-day who are not dependent for some portion of their income upon duties undertaken for State or Local Authority, and herein lie the chief opportunities of the practitioner in the future. Further, the financial assistance so urgently needed must come from the State, or from one of the large foundations interested in the endowment of research, and it might be as well to accord some little consideration to the requirements of the State or to the avowed objects of the foundations concerned.

So far as the objection (*b*) is concerned, while there does at first sight seem to be some justification for the despairing note it strikes, it is precisely in some measure of this nature that salvation is to be found. No doubt scholarships will be given for some years to attract candidates of the desired type to the profession, but the improved conditions promised in the colonial service should eventually make the career sufficiently attractive to young men, and at the same time improve prospects in Government service at home. *One of the main advantages of the scheme for reconstruction now proposed is that it will enable a veterinary school established within a university to recruit young men who have had three years' university training, and who are able to realise that while certain branches of science are quite uncomfortably crowded, others are less so, and that veterinary science among the less crowded ones can offer an interesting and sufficiently lucrative career.* There are numbers of men taking pure science or natural science or an honours course in pathology who might easily be diverted to veterinary science if the advantages of the profession were pointed out to them, and if it were possible to obtain a qualification in a total period of five years.

Briefly, the proposal is this—that teaching and examination in subjects up to and including general pathology should be handed over to a selected university, and that an institute should be formed for the teaching of the subjects of the two final years, the examinations of these two years to be retained by the Royal College of Veterinary

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Surgeons. The university would be willing, no doubt, to institute a degree, which would be additional to the licence to practice. There are many arguments in favour of such a scheme, *but those of greatest importance relate to the higher standard of education that will be attained, economy of the resources of a college reconstructed on this plan, the tapping of a new source of candidates for the profession, and retention of the single portal.* Machinery is to hand for the education of students up to the point indicated by means of university lectures and laboratory courses in such universities as Cambridge with its excellently equipped Science, Medical and Agricultural Schools; and with the saving that can be effected in this direction, a thoroughly sound final school could be organised to teach special pathology and related subjects, pharmacology, medicine and surgery. Students might be diverted from the science and natural science tripos groups to the veterinary side just as they are recruited for medicine, and again an opportunity to enter the final veterinary school would arise after completion of the third year's medical course including general pathology. Does anyone doubt that a student who has successfully completed an honours course in pathology in three years can be equipped to practice veterinary medicine in a further two years?

Within the institute a certain amount of specialization could be arranged; a student might be allowed to devote more of his time to the special pathology group or to the medicine and surgery group, provided certain minimal requirements in each were fulfilled. There remains the problem of teaching such subjects as anatomy, animal genetics, and nutrition. Lectures in the two latter would be available in the agricultural school and could be fitted in during the first of the two years in the final school. Anatomy could be taught either in the zoological department or, if thought necessary, in the final school. The Royal College of Veterinary Surgeons would have the opportunity to satisfy itself as to the student's knowledge of anatomy at the final examinations in pathology and surgery.

The scheme outlined is essentially comparable in every way to the system which produces the best graduates in the medical profession, and on this count alone its feasibility can hardly be questioned.

At the present time, when the Royal Veterinary College is being forced by dilapidations into complete reconstruction, it is the duty of the members of the profession to examine the whole situation most carefully, bearing in mind the resolutions of recent official conferences with reference to the supply of suitably-trained veterinarians for the public services. The rebuilding of the Royal Veterinary College affords an opportunity to reconstruct the curriculum, which may not perhaps be quite so antiquated as the offices and stables, but which

one feels has also been shored up from time to time by baulks of timber when, in reality, new foundations were urgently required. There seems to be no better plan for that reconstruction than the one already outlined, and no university appears so suitable for the purpose as Cambridge.

It is perhaps not generally known to members of the profession that some few years ago a proposal to transfer the Royal Veterinary College to Cambridge was given serious consideration, and that there was then every prospect that the Rockefeller Foundation would endow such a school on the most generous lines, indeed any sum up to a quarter of a million sterling might have been provided.

The project was negatived and interest in the scheme was allowed to lapse. At the present time the Foundation is again displaying the greatest interest in veterinary education, and a representative who is now in England, has been touring the continent of Europe with a view to reporting upon the system of veterinary education in each country. No doubt the first object of the Foundation is the improvement of veterinary education in the United States, but it is reasonable to suppose that any plan for improvement in England would also receive sympathetic consideration from the trustees, *provided always that the proposals were calculated to raise the standard to the extent required*. As a result of the preliminary inquiries now being made, the trustees should be in a position to subject to a most critical examination any scheme that is brought forward; and one may be certain that no plan of reconstruction that is not fundamentally sound will receive the slightest support. The Colonial Office and colonial governments generally are also quite conscious of the defects of our present system, and no doubt are watching carefully for any signs that a move is being made in the right direction. It is to such sources and to the home government that the profession must look for the financial assistance necessary to restore not only the fortunes of our oldest college, but the prestige of the whole profession. It is to be hoped that the crisis which the Royal Veterinary College now faces will assist the profession to a more enlightened view of modern requirements in veterinary education, and that those responsible for the welfare of the College will pause before accepting any plans for reconstruction that do not involve a complete overhaul of the curriculum. The alternatives to such a reconstruction are not particularly pleasant. The only ones that can be foreseen are an eventual forcing of the hand of the Royal College of Veterinary Surgeons by powerful university representatives who may desire to add veterinary science to the list of subjects in which degrees are already granted, and to obtain from Parliament recognition for their degree; or a

steadily increasing invasion of the veterinarian's field in the public services with a corresponding decline in the fortunes of our already impoverished colleges, and eventually the entire loss to the profession of this most valuable division of veterinary science.

IMPRESSIONS OF A VISIT TO SOME OF THE CONTINENTAL VETERINARY SCHOOLS.*

By H. MOLTZEN-NIELSEN,
Copenhagen.

(*concluded.*)

Switzerland has two veterinary colleges, each with 50 students. It is much to be desired that there should be more co-operation, but it must be remembered that the country is divided into 22 cantons, each having strong independent local authorities. With its 39 million inhabitants, Switzerland possesses nine universities and several high schools, and only one of these—the technical High School in Zürich—is federal; all the rest are cantonal. Therefore, the capacity for advanced study is limited in a small province, but there is as a set-off to this cantonal local patriotism and pious devotion to some illustrious celebrity. Switzerland's three languages, and her many religions and sects are all hindrances to any real centralisation.

Of these two colleges, one in Berne and the other in Zürich, I have visited only the latter, which is a combination of the veterinary medical faculty and the cantonal animal hospital. It is ugly in appearance, consisting of two stables, a small building for administration purposes, and a two-storied one for the non-clinical sections. There are only five professors, so their capacities are put to severe tests. The course lasts over eight terms, and is organised on the German methods, generally ending with the doctor's degree.

Although little horse-breeding goes on now, owing to the great amount of motor traffic, there are always many patients, though not particularly interesting ones, in the surgical clinic for horses. Cattle breeding and management of the two national breeds—Simmenthal and Braunvieh—are under veterinary supervision. The ambulatory clinic of the Zürich school is of great importance in this subject, as plenty of good material is to be found in the immediate neighbourhood of the town. There is a rich field of work to be found among diseases of the digestive organs, mastitis, and gestation. Sterilization is also largely practical and is performed according to

* Translated from the "Maanedsaskrift fur Dyrlaege," May, 1928, by F.M.

the methods of Hess and Albrechtsen. There are only 600 veterinary surgeons in the whole country.

In France I visited the largest French College (which is also almost the oldest one in the world) at Alfort, a town which lies at the junction of the Seine and the Marne. It is about an hour's drive from Paris by a tramway which runs along the bank of the Seine. The College extends over a wide area surrounded by walls; much of it is laid out in a garden with monuments of Bourgelat, Bouley and Nocard, and busts of Trasbot and Colin. The buildings are, for the most part, old, one exception being a large quadrangle enclosing departments for anatomy, physiology, and the care of domestic animals; and also the Institute of Colonial Medicine. Here we find, too, a splendid library and museum.

The largest group contains the clinics, divided into surgical and medical (Profs. Coquot and Robin); two parallel buildings with the large covered "*Cour des hopitaux*" between them.

In these buildings there are the usual appliances for operating, Vinsot's apparatus, operation tables, etc. On one side are the surgical horse patients, on the other the very few medical ones. Dogs and cats belong to this section, but they have a small separate department, with double doors for fear of rabies, of which however, there are hardly ever any cases. The College can also receive some obstetric patients, and instruction is given by Prof. G. Moussu once a week in the abattoirs. There is no ambulatory clinic either, but lately a small clinic for skin diseases has been fitted up and is under the direction of Prof. Henry, parasitologist. In all three departments there is afternoon attendance in the out-patients section; and there were really quite a good number of horses, considering how far the College is from Paris, and what a small proportion of horses are left (about one-third).

There are 250 students, or "pupils" as they are called, several foreigners—chiefly from the Balkan states. They struck me as strange, both in appearance and in their red-brown smocks and pinafores. Some of them wear blue caps with gold stripes, denoting the number of their years as students. They live in the College as "internes," eating and sleeping in what is called the "internat" (practically a boarding school), which is a three-storied building containing bedrooms, a Spartan dining-room, and studios which were formerly lecture rooms. Finally, when ill, they are nursed in the Infirmary; for all this they pay the low price of 3,000 francs a year, and there are several scholarships to be had as well. But against this there is the strict discipline to which the students are subjected; they may only leave the College grounds on Thursday afternoons

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and from Saturday afternoon till Sunday evening. They may only receive visitors in a special room near the gates, and with permission from the Superintendent on Wednesday afternoons from three to five o'clock.

The course, which is divided into 12 "enseignements" (professoriates), proceeds regularly under many instructors, and a yearly examination is held at the end of every four terms, on the year's work. To become a student ("élève"), he must have passed his bachelor's degree and must then pass an entrance test, for which he can only present himself once. About half the aspirants are received at this test each time. In spite of their strict life, I have nowhere seen more strenuous work than here, especially in the clinical sections. In their third year the students are allowed to help, then they become assistants and are allowed to carry on—in the fourth clinic, which is quite an important one—operations by themselves on the small animals, and in some cases even on the horses. More supervision in this branch will possibly be given now that present-day work calls for more thoroughness, but, in any case, this responsibility is of great value to the students, many of whom show great skill.

I received a most satisfactory insight into French methods of operations and of the daily work of the hospitals.

While examinations and ordinary treatment are proceeding in the covered court or yard, special operations were being performed in separate rooms, situated in a different building. In front of one of the rooms for instruction in shoeing, there was an operation room for ordinary cases, furnished with a French operating table of an old model (Daviau). Here there were cages for the experimental animals. The next room was for aseptic operations on large animals. Here there was an ingeniously-constructed table (Blin and Seuillet), on which stood a sort of gibbet or gallows, by means of which, in operations on the under parts of animals, the hind leg could be safely held. Apparently it had not been long in use. This room had the disadvantage of being the passage to an inner room, which served as out-patients' department for small animals. Some of their operations had to be performed on this very table.

The general treatment often gave an unfavourable impression. The animals were left too long imprisoned unnecessarily; the horses, as a rule, had no narcotics. Only the old horses were sometimes given 20-40 grs. of sulphonal some hours before the operation. Everywhere a strong nose twitch was employed. A local anæsthetic in some form was given to small animals in serious operations. For laparotomy, lumbar anæsthesia was induced by an injection of 5 c.cm. stovaine (1 per cent.) between the fifth and sixth lumbar

vertebræ. The anæsthetic result is good, but it is a very dangerous medium to use, for, from the sub-arachnoid cavity, the injected fluid has a free passage up round the brain. In human surgery also, they say there is much mortality from collapse, or even if that does not happen, from dangerous subjective symptoms such as headache and paralysis of the nerves of the brain. I was present when a cat was being prepared for ovariotomy, and it collapsed and died a few moments after the injection.

Well as the clinic was equipped, I did not see the simple methods of casting used. I did, however, see the Berlin-Kastetöj used on two occasions—for a throat operation, and for the removal of a swollen testicle. In the latter case the three legs were tied together, while the free hind leg was tied to the ceiling with a rope.

Here, as elsewhere in France, castrations are done with clams. The small horses are done standing; the clam remains on for eight days.

There were not many horse operations while I was there; the patients brought there were chiefly cases of lameness. The diagnoses were very superficial. Hoof excavation was done either with large pincers or altogether omitted. Often the diagnosis was hurried through and not enough attention given to supplementary details. Thermocautery played a very large (indeed, almost the whole) part, and with a few exceptions, the sovereign remedy was the hot iron. Knife-shaped and pointed irons, like ours, only somewhat lighter, were used. The cauterisation was carried out with great regularity, even by the students, and was neatly and boldly performed. I saw one horse suffering from windgall and spavin, branded with 160 punctures, laid on in an oblique line down the whole hock, leaving only a narrow border of skin on the bend of the joint. A few days after the other leg received the same treatment. For windgall of the pastern joint, circular stripes were branded on down to the hoof.

In some cases a penetrating needle-cauteriser, called "thermocautere," was used. It is heated with compound acetylene gas. If eight days after cauterisation there is no suppuration or considerable skin necrosis, as sometimes happens, blistering material (media) is applied. Bandaging is done with broad strong bandages. Inflammation of the flexor tendons which has to a large extent disappeared in light horses, still appears here and there, for this they have only one treatment—neurectomy. This is no longer done on the planter nerves, on account of the disagreeable resultant trophic disturbances. The method now is the median, for the innervation caused to the distal portions of the limb should prevent the above-mentioned complications. As a rule the results are satisfactory. Prof. Coquot

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told me of a thorough-bred horse who, after double neurectomy of the median nerve, had won three races.

While surgical work among the horse patients is still carried out by the original methods, that of dogs and cats has developed more or less along the lines of human surgery. Besides horse operations, the students get much practice in operations on dogs, sometimes as many as 40 going on at once. These operations are required for their examination ; and there were among them important and difficult ones, such as gastrotomy, cystotomy, enterotomy, intestinal resection, hysterectomy, nephro- and nephrectomy (both trans- and extra-peritoneal). During the course of their daily work I saw many of these operations. The technique was good, but not enough attention was paid, in my opinion, to the aseptic precautions so necessary in these cases. I saw ovariotomy by the flank, the method so strongly advocated by the French, for mares and cows, performed on small animals. As they work more or less in the dark, and have often to open both sides, I can see no advantage over our Danish method. Median neurectomy was also performed on dogs for chronic lameness after a fracture. I also saw here one operation which is so generally regarded with mistrust, namely, removal of cataract. Coquot operates on a method of his own, a combination of reclination and discission, which is supposed to hasten resorption of the lens. Coquot maintains that even if he cannot restore the sight completely, yet after the operation the dog has been able to find his way about, and his general health has greatly improved.

In France there are good opportunities (at all events better than in the countries to which I have so far alluded) for enthusiastic men, and they can now use the title " Doctor " as the colleges have introduced the doctorate degree ; this being also the custom in the Germanic countries.

The army still employs many veterinary officers, and there are a considerable number required in the colonies. To prepare for the latter the students supplement their ordinary course by post graduate study in the " Institut Vétérinaire Exotique," which is attached to Alfort. There are a few very special chances of advancement to professorships in the colleges, and there are assistants in each subject. The ordinary positions are gained by competition—the winner is promoted to be " Chef de travaux," when he then shares the teaching duties of the professors.

In order to again differentiate these, the Government authorities instituted, a few years ago, a special distinction, or Fellowship. At intervals one of the colleges offers a competition in one of the 12 branches of instruction, and this includes an oral, a written, and a

practical test or examination. The winner receives the title of "agrégé" or fellow; and although he still retains his post as "Chef de Travaux," he has rather higher pay. The attainment of this Fellowship indicates that he is sufficiently instructed to allow of his competing for the next vacant professorship.

If the French graduate wants to practice, he must set up for himself, as assistants are rare. In France, there are altogether 3,000 practising veterinary surgeons, which cannot be called excessive considering the size of the country. They are fairly well spread about, but possibly to be found most in the north and west. Owing to the kindness of Prof. Jespersen, I was able to spend a few days in two agricultural colleges—one at Le Perche, south-west of Paris, a delightful neighbourhood; the other in the much further west, and more sparse district of Brittany, which all the same possesses many natural and architectural beauties.

Even if these two colleges were the finest, I think the French veterinary surgeons may be said to enjoy a very comfortable position. They had plenty to do, lived in nice houses, and took up a good social position. Their daily work, in all essentials, ran upon pretty much the same lines as does ours in Denmark. Translated into Danish money their salaries, too, were about the same as ours. Operations in these colleges were carried out carefully and well; both were well equipped and had the Vinsot apparatus installed in a glass shed in a yard by the side of the dispensary. Serum treatment is more universally used than with us. One field is, however, still uncultivated, viz. that of gestation and sterility. Both districts have special horse-breeding establishments and studs, and the infectious births that took place among the mares last year entailed serious loss.

If the French veterinarians are better off than some of their neighbouring colleagues, they are, on the other hand, forced to compete with double the number of quacks. Many of these latter are running big, smart practices, and leading a by no means hidden existence. Their only grievance is that they must not attend infectious cases. These are entrusted wholly to the Government officials. Until very lately there were 87 departmental veterinary surgeons, but now for economic reasons, they are reduced to 50 local ones. They are exclusively Government officials and not entitled to practice privately.

While Germany is well up to date in the nature of our work in Denmark, this was not at all the case in France. The *entente cordiale* that we hear so much of between France and Denmark does not seem to have extended to veterinary circles! The reason of this is undoubtedly the language difficulty, for the French know of our work only through English and German reports.

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The Belgian Veterinary College was started in 1850, but in 1910 was removed to Cureghem, in the southern quarter of Brussels, where it was rebuilt and now presents a very stylish appearance. Behind a large building, containing the library and administrative offices, lie the other departments separated by grass plots and asphalt walks. Among the rest lie two buildings—one for serum and one for vaccine production, and a "laboratoire de l'inspection vétérinaire" for bacteriological investigations. All the departments are well equipped, though less weight seems to be placed on the museum, with the exception of the collection of deformities.

The arrangement of the clinics is somewhat peculiar. There are only two, one for big and one for small animals. But each clinic has two chiefs who come alternately every day. The heads of the clinic for big animals are Prof. Hermans (surgery and shoeing), and Prof. Huynen (medicine and obstetrics). For small animals the heads are Profs. Hébrant and Antoine. While the latter clinic is comparatively small and lacks an aseptic operation room, the place for big animals is immense. A large waiting room for the out-patients, and splendid examination room with four loose boxes, both these rooms have very high ceilings. Finally, a very large operation room with two Vinsot's apparatus and a 50 cm. thick straw mattress sunk into the floor. The fact that there were so few patients in the stables gave them a somewhat crude appearance. They have no ambulatory clinic, but four students receive free lodging in return for acting on duty day and night, and treating the wounded animals which are brought in from time to time.

The teaching staff consists of 10 professors, which number the Government wishes to reduce. There are also six assistants who are "Agrégés"; each of these works in more than one section if he so wishes. There are 200 students in all, and before entering college he must have passed his Bachelor's degree. As the College is not a Faculty, the students study for the first six months of their course in the University, together with the doctors and pharmaceutists, in the general rudiments of science. They then continue their course in the Veterinary School in three parts and after passing all the examinations he is called "Docteur en Médicine" without having defended any thesis. The colonies require a certain number of men, but otherwise there is not a very large number of official jobs.

The national horse-breeding industry in Belgium is, of course, an important one for the profession. This industry was practically killed during the War, but is now being resuscitated again. I had the good fortune to visit one of the largest breeding studs in Belgium, near Louvain, and saw how it was run. Here, as in most of the

breeding stables, the cultivation of the very big horse has been more or less abandoned, and they are concentrating on medium-sized type. The exports are chiefly to Germany, and, latterly, to Italy and Spain. After various transactions with worthless horse breeders had awakened in America a mistrust of Belgian horses, some Belgian horse breeders formed the "Société Nationale d'Exportation du cheval Belge." At the head of it is a veterinary surgeon, Dr. Royer, whom I have met here in Denmark when he came with a French commission for the purchase of horses. The aim of this society is to extend a knowledge of the Belgian horse, and without any profit, to help the foreigner to find the stallion for which they are seeking; and thus supply them with trustworthy stock. As propaganda they have presented the Spanish government with a fine four-year-old prize stallion.

When I was in Belgium on King Albert's birthday I was at his review of his troops; there I saw some lovely specimens of the smaller type of horse, "the Ardenner." Not only was the mass of troops imposing, but it was delightful to watch the manœuvres of the artillery carried out on their stout little horses, who were all of the same colour in each battery. Also the trick riding was very fine, especially with some Irish horses; the officers' mounts were nearly all thoroughbreds.

Holland's Veterinary College, which is one hundred years old, has, within the last two years, given up its independence and now constitutes the Seventh Faculty of the University of Utrecht. The affiliation with the university is regarded as an important event in veterinary circles. As a result of the change the veterinary students now do their elementary rudiments of science alongside the doctors and dentists. The course lasts five years, but at the end of the fourth year they pass their chief examination. The student spends his last year in going from one section to another—in turn—acting as co-assistant in each, and occasionally being permitted to undertake diagnoses and operations on his own account. Each section has a professor and an assistant. The Faculty also has the right to a degree, but not a very large number take advantage of it. The original college also had this right. There are 200 students (one is a woman), and 800 qualified practitioners throughout the country.

After 10 years' practice, a veterinary surgeon may become a Government official; he gets a good salary, but may not practise privately. The chief studies are at present carried on in the old college, which stands at one edge of the town. It reminds me very much of our Danish school, having been added to and improved many times. The various departments are arranged very much on our lines, too, with the exception of the Out-patients Department and the

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Ambulatory Clinic, which are quite separate, and attached each to its own section. With the exception of the Obstetric Department, small animal and bacteriological sections, the others are modern and well equipped. Far from the old college area, in a sparsely populated quarter of the town, lie the two new schools—one for normal anatomy, the other the clinic for small animals—both equipped in entirely modern Dutch style. In the first-named building, the outer portion consists of dissection rooms, lecture room, and laboratories; the middle portion (very lofty with top light) is sumptuously arranged as a museum; in the centre a collection of skeletons; a large gallery running the whole way round the room.

The clinic for small domestic animals (Prof. Jakob) was (as in the case of the other clinical and operation rooms, laboratories, X-ray installation and lecture room) provided with a large waiting room and examination room for the out-patients, which department is greatly used. A large number of the patients are the dogs used so much in this town for draught purposes. As a rule they are strong dogs of mixed breed. They are harnessed to little vegetable and milk carts, and when they come to a house they settle themselves down comfortably and rest till it is time to go on to the next house. They are only charged 40 centimes—half price—for their consultation fees. The stables are in three compartments housing 50 horses, and are about 60 yards from the principal buildings.

The pathological-anatomical school (Prof. Schrotnacher), which is nearly 20 years old, was so well equipped and with such great foresight, that it is still fairly up to date. Very practical, though not handsome, the museum is completely fire-proof, having two stories, and being equipped with iron-grilled compartments and iron safes. There is a section room and demonstration hall in a separate building.

The medical clinic is under Prof. Wester's control. It has a large research room, research is carried on systematically, and the clinic is supplied with the laboratory results.

The surgical clinic (Prof. Hartog) is divided into a stable (30 horses) and a modern-equipped building containing laboratory, museum, and lecture hall. The ground floor consists of three large, light rooms, two examination rooms, with Vinsot apparatus and loose box; also an operating room with Vinsot and a mattress. Near by is the instrument sterilizing room.

The floors here have almost reached the ideal for a horse clinic. They are of yellow Dutch brick, polished but not glazed enough to cause the horses to slip. The use of the Vinsot apparatus is not confined to the extremities. When used with a slightly different

method of confinement, it is very convenient for both operator and patient in operations for crypt-orchids and castrations.

The narcotics used were chloral injected intravenously supplemented with chloroform. Castration was performed with the emasculator on the bare testicle, and amputation of the penis was made after an injection of novocaine in the upper part of the latter. Pre-operative disinfection consisted of dry rubbing and iodine brushing, but the hoof was always thoroughly scoured. There was a good deal of use made of deep cauterisation for bone trouble, but in some cases of spavin periosteotomy (Peters' method) was preferred.

With the periodic eye inflammation which is prevalent in Holland in certain districts, protein therapy has been tried, but without success. Removal of Hygroma of the elbow is done as follows: It is tapped and tincture of iodine injected; this is left in for a short time and then drawn out. This is repeated after a few days, and at the end of 10 days the skin splits, after which the dead material can be extracted; this is generally done with a sharp curette. With sutures the wound often heals by first intention. I saw several of these bursal enlargements in the surgical museum, where I found, also, a wonderful collection of preparations of tendon inflammation, which seems to occur chiefly among heavy horses. When all the symptoms point to this disease, novocaine is injected over the median nerve on the inferior third of the inside of the arm. If this test gives a positive result, the operation takes place immediately in a similar manner to that of the plantor neurectomy for pastern joints, on a standing muzzled horse. This is a better method than casting the horse.

As may be gathered from the foregoing notes, I did not come across any epoch-making novelties in my journey. Veterinary surgery is working solidly on towards the goals foreshadowed in the great advance made in the last century. Only minor surgical operations are performed on cattle and swine, as a rule, owing to their value and suitability as food. It cannot be denied that the reduction in the number of horses now used has caused a great diminution in the best clinical patients—namely, the "luxury" horses. The low price paid for horses nowadays is, also, a hindrance to undertaking long and expensive treatments in the case of "useful" horses. But, on the other hand, surgery has gained ground in the case of small animals; owing to greater facility in handling and treatment, tumours, growths, etc., can be manipulated in a manner that is not possible with large animals. There is the further advantage with small animals that the economic question being less important, tedious and costly cures are quite permissible.

Finally, there only remains for me the pleasant duty of tendering my hearty thanks to the directors of the " Jens Veibel Neergaard's Bequest," without whose help it would have been impossible for me to undertake so comprehensive a journey. I also offer my warm thanks to Profs. Bang and Mörkeberg, whose introductions opened so many doors to me, thus ensuring the success of my journey. This gratitude is further extended to those kind persons, official and private, who so generously extended their friendly hospitality to me wherever I went.

A SURVEY OF THE DEVELOPMENTS OF RESEARCH INTO BOVINE CONTAGIOUS ABORTION DURING THE PERIOD 1895—1928.

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(*Continued from p.* 295.)*

Section III.

In 1919 Seddon[26] showed that after intravenous injection of a living emulsion of *B. abortus*, it was possible to recover the organism from one of the testicles of a three-months-old bull. This experiment lent support to the suggestion already made by Schroeder and Cotton that the organism showed a peculiar affinity for embryonic tissue.

His experiments confirmed the view taken by these workers, that in a majority of cases of abortion the organisms succeed in finding a lodgment in the mammary gland after the uterus has become free from infection, and that such organisms may provide infection for the uterus at a subsequent pregnancy.

Seddon stressed the importance attaching to the determination of the greatest concentration of non-specific agglutinins present in the blood of non-infected cattle, and in default of the examination of the sera of a large number of healthy animals, drew attention to the break in the table of agglutination reactions of a herd which he had tested.

Five animals gave a titre of 1 in 20, none of 1 in 50, and then two of 1 in 100. At no other part of the table was there such a marked break, and he considered it reasonable to assume that the agglutination at 1 in 20 was due to non-specific agglutinins, and that at 1 in 100 to specific and non-specific agglutinins. He then rather arbitrarily placed the minimum infective titre at 1 in 100.

* It is regretted that Section II, which appeared in the June issue, was marked "concluded" in error.

In the same year Cotton [27] drew attention to the part which spirilla might play in producing abortion in cattle. He referred to a report by Theobald Smith[28] which stated that from 41 cases of abortion in a group of herds under one management, with intercourse between the herds, *B. abortus* was recovered from 27, and a spirillum from 14, and that in no instance were both organisms found in the same animal. Smith considered the organisms to be mutually exclusive, and asserted that the vibrio or spirillum required reduced oxygen tension for growth, in the same way as *B. abortus*, and seemed to have the same characteristics as the vibrio of ovine abortion described by M'Fadyean and Stockman[29] in 1913.

Unfortunately, no report of blood tests was furnished in these cases, and they are therefore of doubtful evidential value.

Buck and Creech had found vibrio and *B. abortus* present in two cows, and vibrio alone in two others, but they did not claim to have traced any real etiological relationship between the vibrio and the abortions.

M'Fadyean and Stockman had found it difficult to infect cattle with the vibrio of ovine abortion, although they reported two outbreaks of such natural infection in cows, and considered that cattle might be a factor in the epizootiology of ovine abortion.

From these and other investigations which have been made, it is possible to accept the view that abortion in cattle, due to a vibrio or spirillum, is of rare occurrence, and of very slight economic importance.

It is perhaps appropriate at this point to deal with the question of the infection of swine with *B. abortus*.

So late as 1919 most workers considered that cattle were the only animals which became naturally infected with the organism, although a few cases of infection in swine had been recorded.

Good and Smith in 1916 isolated *B. abortus* from the afterbirth and fœtus of an aborting sow, and produced abortion with it. Such cases were most likely to occur on farms where the cattle were infected with contagious abortion. Hayes[30] a few years later infected a sow intravenously, and was able to isolate the organism from one udder.

In 1922 Cotton[31] tried over and over again to infect pregnant sows by feeding ordinary strains of abortion bacilli isolated from cattle, using them in cultures in guinea-pig tissues, and in fœtal and placental tissue from aborting cows, but always failed.

In 1924 Schroeder and Cotton[32] succeeded in isolating *B. abortus* from the seminal vesicles of two out of four boars which had been exposed to infection through feeding. No lesions were found in any part of the genital tract when the animals were killed after 177 days,

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but the sera agglutinated at a dilution of 1 in 100. They considered it possible that the boar might be a more important factor in the dissemination of abortion in swine then the bull was thought to be in the case of cattle.

They found that the sera of naturally infected swine did not agglutinate *B. abortus* in so marked a manner as did the sera of infected cattle.

Schroeder[33] found in the case of a swine outbreak that the lesions produced in guinea-pigs were much grosser than those caused by the organism isolated from cattle, and one swine strain injected into guinea-pigs resulted in the formation of orbital tumours containing the organism.

It was possible to differentiate the swine and bovine strains by noting these differences in the guinea-pig lesions.

Schroeder and Cotton[32] inoculated guinea-pigs with attenuated bacilli of swine origin, and later infected them with virulent bovine and swine strains. A high degree of resistance was developed, which declined after three months. Guinea-pigs inoculated with bovine strains also developed an equal resistance to both strains.

They were eventually able to pass swine strains of the organism through cattle, and vice versa, but up to the date of publication of their results (1924-25) they had not been able to produce any modification of either strain, and they regarded them as epizootiologically disparate.

From these researches it appears to be definitely established that abortion in swine is sometimes caused by *B. abortus*, but as the incidence of the disease is slight it is fairly safe to assume that these animals are relatively insusceptible even to strains of the organism which can be regarded as " native " to swine.

That abortion in mares may occasionally be caused by natural infection with *B. abortus* was shown by McNutt and Murray[34] who isolated the organism from the organs of a foal fœtus and identified it by tests against positive bovine sera. Contagious abortion existed among the cows and sows on the same farm.

The thermal death-point of *B. abortus* had already been investigated by various workers, and the report by Cotton[27] in 1919 that the organism was killed by heating for 15 minutes at 60° C., but resisted 55° C. for 20 minutes or longer, was in fairly close agreement with the earlier findings of M'Fadyean and Stockman. Cotton pointed out that pasteurized milk could, therefore, be considered to be free from such infection.

The viability of the organism at room temperature had also been investigated. Mohler and Traum had found bouillon cultures alive

after eight months, and Holth after nine months. It may here be noted that the writer has found agar slope cultures, capped, and kept in the dark at room temperature, alive after twelve months. Twelve strains so treated were subcultured aerobically with ease.

Although the report was made in 1926, reference may be made here to the work of Matthews[36]. He ground up infected fœtal membranes in a meat-chopper and spread the resulting moist mass in thin layers on glass plates, which were left to dry in a cool dark room. So treated, he found that the organism retained its virulence for guinea-pigs 120 days after expulsion from an infected animal, but not after 150 days.

Schroeder and Cotton[27] investigated the important question of the viability of the organism when subject to the variations of temperature and humidity imposed by natural climatic conditions.

They found that uterine exudate exposed on the ground for ten days in February, when the weather was warm for the season, dried into a leather-like mass, but still contained living abortion bacilli. They also exposed infected placentæ and fœtal organs under a fly-screen in a wood on December 22nd and found living bacilli present at the end of January, i.e. 38 days later, and also on May 5th—after 135 days. During this time the material was more or less protected by fallen leaves.

The maximum time after abortion at which they found the uterus of a cow still infected was 51 days. Cows given large intravenous injections of *B. abortus* shortly before œstrum, failed to show any development or elimination of the bacilli from the uterus. An intravenous injection made 11 days before parturition caused infection of the placenta, and an injection into the udder, 53 days before parturition, had the same result. They therefore considered that the danger of infection appeared greatest some time after conception, when there was a sufficient amount of embryonic tissue formed, on which the bacilli could grow.

They regarded the life of the organism in the udder as a sort of resting stage in its existence, due to a commensal relationship being established between it and the udder cells.

Buck and Creech[27] had reported the recovery of abortion bacilli from the joint of an infected cow which showed lameness, and Schroeder and Cotton suggested that regions of reduced vitality might be liable to infection.

The former workers had also found the seminal vesicles of four bulls to be infected and showing definite lesions, and Cominotti[35] later showed that *B. abortus* could cause orchitis and a chronic epididymitis.

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Schroeder and Cotton were unable to infect any cows by means of bulls, although they had satisfied themselves that bulls could become naturally infected.

Both the latter noted that it was common for cows that had aborted to require several services before the next conception took place, and thought it probable that this was due to the damage caused to the mucous membrane of the uterus. They regarded agglutination at 1 in 100 as a positive reaction, and animals which reacted at 1 in 50, but not higher, were regarded as at least unsafe for contact with clean herds. They found that reactions in calves were very apt to be associated with the presence of abortion bacilli in the placentæ, and regarded the latter as the probable source of the agglutinins present in these calves, rather than the maternal blood.

The experimental work on vaccination reported by Stockman in 1914 was followed by investigations into the efficacy of the live vaccine by numerous workers, particularly in the U.S.A., most of whom were not able to record as encouraging results as had been obtained in Britain.

Fitch, Boyd and Lubbehusen[36] after conducting experiments with immunising agents during a period of six years, formed the opinion that " bacterins, vaccines and sera " did not reduce herd losses to a desirable minimum.

Huddleson[33], in 1920-21, reported more favourably on vaccination experiments conducted in Michigan over a period of several years. The data showed an apparent decrease in the abortion and sterility rate of the treated animals, and a marked increase in the breeding efficiency of the treated over the untreated ones. The milk of several cows showed very little increase in specific agglutinin contents a short time after vaccination, and this milk was injected into guinea-pigs with negative results. Vaccination experiments in a herd which was free from infection prior to vaccination, showed that calves born to vaccinated animals gave negative reactions to the serological tests at birth. Also, cultural examinations and guinea-pig inoculations failed to show the presence of *B. abortus* in the milk of such animals, although it was isolated from the milk of infected controls and from their fœtuses. Infected controls aborted about ten weeks after the appearance of specific antibodies in their sera.

As Huddleson pointed out, there are many secondary complications following abortion disease, but these complications also follow parturition in the absence of such disease, and it is therefore next to impossible even in adequately controlled experiments to accurately estimate all the effects of vaccination.

Huddleson also made some interesting cultural experiments. He

found that liver-infusion agar filtered through glass-wool was a good medium, and also that the reaction of the medium was important.

He showed that the reaction of the amniotic fluid, and the meconium of several aborted fœtuses lay between a pH of 6·4 and 6·8, depending upon the time of titration. Acidity decreased rapidly on exposure to the atmosphere, due to the volatilisation of carbon dioxide. He therefore advised the use of media having a pH between these figures.

His investigations showed that growth in primary cultures was not governed entirely by oxygen tension, but also depended on increased carbon dioxide tension, such as existed in the gravid uterus and the udder. In a jar containing 10 per cent. of carbon dioxide gas, the reaction of the contained atmosphere, as measured by the H-ion colorimetric method, reached the desired pH of 6·6. Medium inoculated with infected material and placed in a jar in which 10 per cent. of the air had been replaced by carbon dioxide, grew *B. abortus* in 24 to 48 hours at 37° C., a result comparable to that obtained by growth in association with *B. subtilis* (Nowak's method, already referred to). Guinea-pig inoculation results corresponded very closely with those obtained by this method.

Huddleson also found that gentian violet in a final dilution of 1 in 10,000 inhibited the growth of other bacteria than *B. abortus*.

A few years later Harms[34] studied the behaviour of the early generations of cultures derived direct from pathological material, and showed the wide variations of various strains in their adaptability to ordinary atmospheric conditions. Of 15 strains examined, two developed in the presence of air in the first generation, two others in the second, and one in the third. Of the 10 remaining, five still failed to develop in the fifth generation, three in the eighth, and two in the twelfth, but all grew well in air at the thirteenth or subsequent generations. Strains once accustomed to air retained the characteristic indefinitely, even after animal passage.

These experiments explain in some degree the diverging results obtained by Bang and M'Fadyean and Stockman in their early cultural studies of Danish and British strains of the organism.

In 1922 the subject of vaccination was again reviewed, this time by Schroeder[37]. He regarded it as still being in the experimental stage, and pointed out that the main danger was the risk of infecting the udder, thus making cows "long persistent dangerous carriers and disseminators of abortion bacilli." As he remarked, "a subcutaneous injection may at any time, unknown to the person who gives such an injection, become a partial intravenous injection." Schroeder and Cotton had previously proved that intravenous injections of

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abortion bacilli could infect the udder, and Giltner, Huddleson and Tweed[37] had shown that animals which carried organisms in their udders and did not abort, repeatedly showed abortion bacilli in their uterine exudates at parturition. Schroeder was therefore justified in pointing out the risks which attend the use of the live vaccine, although Huddleson's findings in this respect were negative.

In the same year, Craig and Kehoe[38] by milk inoculation experiments, confirmed the evidence obtained by Schroeder and Cotton, that a large proportion of infected animals remain infected for years.

They held, as a result of their observations, that immunity by the use of a live vaccine was not in any way related to the presence in the blood of specific agglutinins. They regarded vaccination with live vaccine as the most efficient means of dealing with herds in which abortion had gained a strong hold.

In 1923 Sheather[39] made a study of the occurrence of *B. abortus* in the milk of infected cows. Fifty samples of milk from cows giving positive reactions to the agglutination test, were inoculated into guinea-pigs. Seventeen of these (34 per cent.) proved positive by guinea-pig sera agglutinations, but Sheather explains that this figure was " possibly a little too low for the reason that during the investigation an epidemic made its appearance among the guinea-pigs and caused the death of some of them before their blood had been tested the requisite number of times." The suspension of bacilli used in the tests was standardised by means of a disappearing platinum loop (Gates' method), but the standard adopted was not stated.

As agglutinin formation in guinea-pigs infected with *B. abortus* is not usually as marked as it is in the case of rabbits so treated, it appears reasonable to suggest that a higher positive percentage might have been obtained if *post-mortem* examinations had also been made where possible.

Sheather was unable to confirm the work of Seddon as to the possible utility of whey in place of serum, as he found a great divergence in the titres. It was unfortunate that the blood and milk samples were not obtained on the same day, but the possible variation due to this time factor did not account for some of the large variations recorded between the serum and whey titres of certain of the cows.

In the same year Quinlan[40] investigated the vital question of the infectivity of calves with *B. abortus*. He found that specific antibodies sometimes appeared in the blood of calves which had been fed on infected milk. The sera of calves from infected mothers, which were fed on such milk, showed a higher agglutination titre than that of healthy calves fed likewise. He showed that this antibody formation was of a temporary nature, and considered that calves ran no risk of

becoming carriers of the disease, even if fed with infected milk up to the age of six or seven months.

Quinlan's conclusions, although no doubt in the main reliable, are open to criticism, because he placed the titre for a positive serological reaction at 1 in 200, and for a positive milk reaction at 1 in 80. It is therefore likely that antibodies persisted in the blood of some of the calves for a longer period than recorded. It is interesting to note that Quinlan, like Sheather, found that the agglutination titre of milk fluctuated greatly as compared with that of serum from the same cow.

Quinlan's standard for his bacillary emulsion was described as of " such a density that one could easily read common print through a 1·5 cm. stratum." This cannot be regarded as conveying to other workers an accurate record of the density used.

In 1924 M'Fadyean[41] made a report on a long series of observations of an infected herd, the sera from which had been subjected to repeated agglutination tests. Titres of 1 in 25, 50, 100 and 200 were used. Eleven series of tests were made during the period 1913-22. The premises occupied did not permit of the complete isolation of diseased or suspected animals. The herd consisted of " 35 cows, one or two bulls, and about 20 heifers and calves."

During the ten years, 40 cows and one bull contracted the disease. A 10-months-old heifer reacted to the test, and agglutination was still complete at 1 in 100 when the animal was 16 months old. After Quinlan's work, calves were generally thought to be able to throw off infection before reaching early maturity, but this case showed the advisability of testing yearlings as well as fully developed animals.

The observations showed the endurance of infection in a number of the animals, and the insidious way in which it continued to spread pointed to the impossibility of limiting infection on farms where reactors could not be satisfactorily isolated.

In December, 1923, Fitch, Boyd and Lubbehusen[36] commenced an interesting field experiment which threw fresh light on the possibility of limiting the spread of infection by means of practicable isolation methods.

They established two experimental herds and housed them in two barns, which were separated by not more than 75 feet. One herd was infected, and the other was clean, as determined by agglutination and complement-fixation tests which were applied to the sera of the latter every month. Both herds were attended by the same men, but each herd had a separate paddock, so that there was no physical contact. No special precautions were taken by the men, and drainage was from the infected towards the clean herd. During the period of

observation (January 1st, 1924, to February 1st, 1926) only one animal in the clean herd became infected.

In 1925 Barnes[42] as a result of his investigations, expressed the opinion that the suppression of abortion by the elimination of reactors was a slow but worth-while process. He considered that repeated blood tests should run clear for a year, before a herd could be considered to be free from infection.

(To be continued.)

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A NOTE ON INFECTIOUS NECROSIS OF CANARY BIRDS.

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An infectious disease of cage birds for which the authors suggested the name of infectious necrosis, was described by Miessner and Shern[1] in Germany in 1908. An excellent summary of the condition will be found in Ward and Gallagher's work, "Diseases of Domesticated Birds."[2] The only reference to the condition in the English literature appears to be a brief note by Gray[3] in 1910, who states that a disease of this nature causes considerable losses in the aviaries of canary breeders in this country. He mentions that McFadyean reported the cause of the condition to be a small gram negative bacillus and that the disease was not communicable to pigeons.

A small outbreak which was considered to be of sufficient interest to merit further study and investigation, was encountered in the

aviaries of a firm of commercial distributors. The material first available was the spleen from a dead canary which had been sent to the Institute for diagnosis by the veterinary adviser to the livestock department of a London store. The spleen appeared enlarged and was crammed with small yellowish-white nodules. Cultures from these lesions, however, were overgrown by a lactose fermenting organism of the colon type. A live affected bird which was then obtained, appeared on arrival very dull and sleepy, and showed every indication of early death. It was destroyed by chloroform and a *post-mortem* examination carried out.

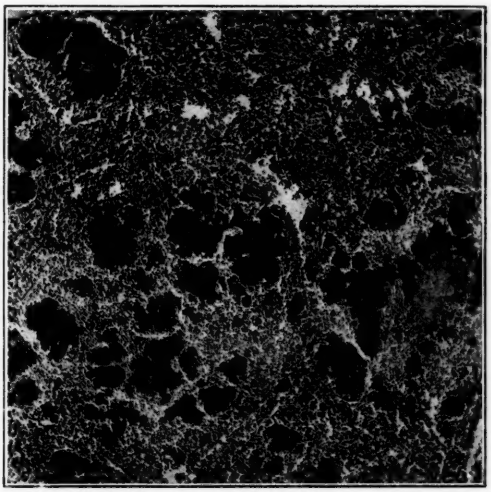

FIG. 1.

On autopsy, the most striking abnormality was a marked enlargement of the spleen which measured 1·3 cms. by 0·6 cms., and contained a large number of small yellowish-white areas about the size of a pin's head, the largest measuring 2 mm. in diameter. These foci were slightly raised above the surface and caused an irregular studded appearance. The liver was much paler in colour than the normal and had a yellowish tinge; scattered throughout its substance were numerous areas similar in appearance to those in the spleen, but smaller in size, the majority being mere pin points and the largest about 1 mm. in diameter. The lungs contained similar lesions, but they were not so abundant as in the spleen and liver. In the right kidney, in the region of the mesonephros, a single lesion measuring

between 1 and 2 mm. in diameter was present. Smears from the affected organs showed large numbers of a small short gram negative bacillus. Cultures in serum glucose broth and on serum agar from the spleen, liver and kidney yielded a fairly abundant growth of a small short gram negative bacillus in pure culture. A few drops of heart blood spread on serum agar yielded a number of scattered colonies.

Two more canaries which were subsequently obtained, killed and examined, showed very similar *post-mortem* appearances to the one just described.

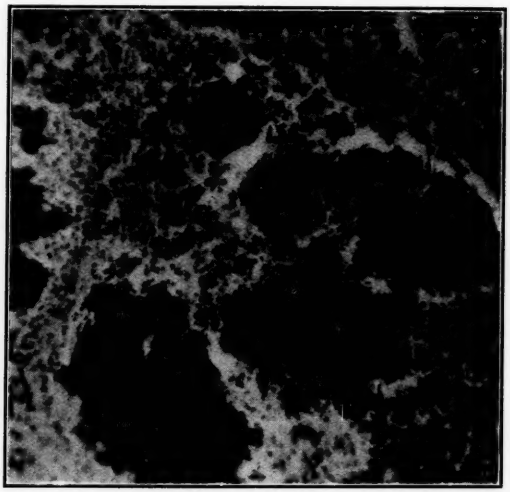

FIG. 2.

In canary 2, the liver was dark and congested and had numerous yellow pin-head spots scattered throughout its substance. The spleen was enlarged and thickly beset with the characteristic lesions. The lungs and kidneys were apparently unaffected. Cultures from both liver and spleen gave an abundant growth of the organism, and a few drops of heart blood yielded 60 to 80 colonies. Examination of canary 3 showed that the liver was not so extensively affected as in the previous cases, only about five yellow areas of 2 mm. diameter being observed. There were, however, extensive peritoneal adhesions between the liver and the intestines, while a mass of yellow caseous material adherent to the ovary and intestines appeared to be all that was left of the spleen. An abundant pure growth was obtained from the liver and from the heart blood.

Histology of the Lesions in Canaries.

SPLEEN.—Examination of a section of an affected spleen under a low power showed a large number of rounded, irregular, structureless areas which, in general, stained a uniform purple colour with haematin and eosin ; the larger areas, however, showed an inner portion which had an affinity for eosin. Under higher magnification they appeared finely granular, and when treated by Leishman's stain were found to be entirely composed of masses of small bacilli (Fig. 2). The inner zone of the larger areas which stained a diffuse pink, appeared to be composed of dead bacillary bodies intermixed with cells of the spleen pulp,

FIG. 3.

a few normal bacilli retaining the blue stain being scattered irregularly in the pink mass. Immediately surrounding each bacterial mass was a narrow zone of cells, many of which appeared abnormal, their cytoplasm being granular and their outline indistinct ; in some the nucleus was beginning to break up. Many leucocytes containing phagocyted bacilli were present in this zone. When engulfed in the cell cytoplasm, however, the bacterial bodies stained pink so that under a lower power these leucocytes had the appearance of eosinophiles. A short distance from the bacterial foci the cells of the spleen pulp appeared healthy, but intermixed with them were a great number of apparently normal red blood corpuscles.

LIVER.—Numerous amorphous areas, similar to those seen in the spleen and like these composed of masses of bacteria, were present

in sections of affected livers. A narrow zone of inflammatory cells surrounded each area, but these cells had undergone so much degenerative change that no phagocytosis could be made out. The histology of the liver of canary 1 was most striking on account of the extensive fatty changes that had occurred, the liver parenchyma being almost entirely replaced by a vacuolated network with blood corpuscles interspersed between the cell outlines, so that no normal liver tissue appeared to have been left.

Histological examination of the livers of canaries 2 and 3 and of artificially infected sparrows showed little or no fatty changes. The

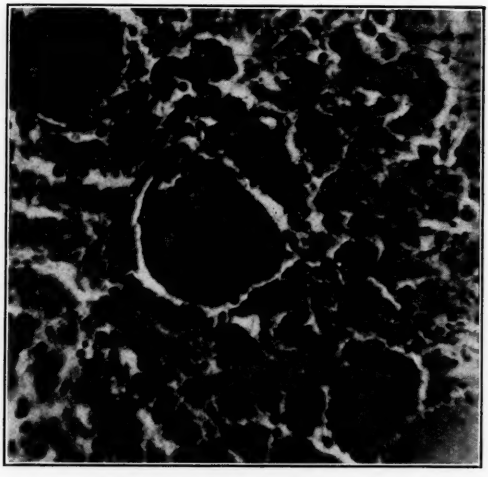

FIG. 4.

bacterial foci in the liver of canary 2 were particularly numerous and small in size, and they appeared to have originated in the sinusoids of the liver. The liver cells appeared swollen and the cell outlines indistinct; the blood vessels and the sinusoids were very congested, and the blood appeared to contain a very high proportion of leucocytes (Figs. 3 and 4).

Characters of the Causal Bacillus.

The organism isolated from the affected birds was a small, short gram negative bacillus with rounded ends. In culture it had a tendency to grow in short chains. It was somewhat pleomorphic both long forms and forms so short as to appear coccoid, being encountered. The average size of the bacillus was $1 \cdot 6\mu$ by $0 \cdot 5\mu$; it was non-motile, produced acid but no gas in glucose, lavulose, maltose, mannite,

and arabinose. Lactose, saccharose, inulin, dulcite, salacin, glycerin and litmus milk were not affected, and indol was not formed. A heavy growth was obtained in broth which later flocculated and settled, leaving a clear supernatant liquid. On agar, small translucent colonies about the size of a pin's head appeared and increased in size up to about 2 to 3 mm. in diameter. The organism grew fairly readily on potato in a characteristic manner. At 24 hours a fine, thin, moist, slightly glistening growth of a pale yellow colour was apparent which, with continued incubation, increased in thickness and darkened in colour, finally becoming a dirty light brown.

Pathenogenicity.

The organism proved to be pathogenic for mice, guinea-pigs and sparrows—the only experimental animals which were tested. 2·5 cc. of a 24 hour broth culture, injected subcutaneously, killed a mouse in three days ; 0·5 cc. killed in four days. The *post-mortem* appearances were an enlargement of all the lymphatic glands and great enlargement of the spleen, which was of a bright red colour. The organism was readily recovered from the heart blood and spleen.

Two guinea-pigs were inoculated with 1 cc. of a 24 hour broth culture, one subcutaneously and one intraperitoneally. The guinea-pig which had been inoculated subcutaneously, died 15 days later and was in a very emaciated condition. *Post-mortem* examination showed that the precrural lymphatic gland adjacent to the site of inoculation was enlarged and contained a yellow pus. Yellow caseous nodules about the size of a pea were also found in the intercostal muscles between the last three ribs. A peritonitis with an excess of clear straw-coloured exudate was present with a diphtheritic deposit covering the liver, intestines and mesentery. The liver was much enlarged and thickly beset with yellowish-white foci from a pin point to a pin head in size, and adhesions had occurred between the hepatic lobes and the adjacent mesentery. One mesenteric gland was found to be enlarged and to contain two centres the size of rice grains. The epididymis of each testicle was congested and pin-point foci were present in the mesorchium. In the chest there was an excess of clear straw-coloured fluid. One suprasternal lymph gland was enlarged and caseous, and about 20 nodules varying in size from a pin's head to a barley grain were present in the lungs. The general *post-mortem* appearance of this guinea-pig bore a considerable resemblance to generalised tuberculosis of this animal. The bacillus was recovered in pure culture from the heart blood and from a nodule in the abdominal wall.

The guinea-pig which received 1 cc. of broth culture intraperitoneally

was killed 15 days later when very emaciated and weak. The general *post-mortem* appearance was similar to the guinea-pig injected subcutaneously but, in addition, a purulent peritonitis had been produced, resulting in extensive adhesions of the abdominal viscera. There was an excessive amount of thin, milky, peritoneal fluid. Both testicles were adherent to the scrotal sacs and when cut, showed caseonecrotic areas in the gland tissue. An extravasion of a clear fluid into the chest cavity had occurred with adhesions between the pericardium and chest wall. The pericardial sac contained small pin-point nodules in its wall, and the lungs were beset with numerous small foci. Attempts were made to infect six sparrows by the mouth, 2 cc. of a broth culture being added to about 20 cc. of the drinking water every second day for a week. All the birds ultimately became ill and died after periods varying from 8 to 23 days. In three cases a sick bird was killed by its still vigorous fellows. The naked eye appearance of the lesions in the affected sparrows were identical to those seen in affected canaries. Histologically the lesions were also similar, although the fatty changes in the liver which were present in canary 1, were not encountered. No recognisable lesion could be detected in the alimentary tract. The organism was recovered from the heart blood and visceral lesions.

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(1) Miessner and Shern: "Die infectiose Nekrose bei den Kanarienvogeln" *Arch. f. Tierheilk. Bd.* 34, 1908, S. 329.
(2) Ward and Galagher: "Diseases of Domesticated Birds," pp. 252-254.
(3) Gray: "Disease in Canaries," *Vet. Rec.*, Vol. XXII, 1910, p. 753.

INTERNATIONAL CONFERENCE ON FOOT-AND-MOUTH DISEASE.*

ORGANISED by the Bureau International d'Epizooties, an International Conference was held in Paris from May 15th to 20th, 1928, which was attended by delegates from 33 countries.

This conference dealt specially with foot-and-mouth disease, and each government was represented by its chief authorities on this matter. The most famous bacteriologists who have studied the disease were gathered together in Paris for the purpose of discussing the subject from every point of view and expounding what knowledge they possessed of the disease. The following may be considered among the most important conclusions arrived at at this Conference: recognition of the plurality of viruses, nomenclature of the three types of virus known up to date, adopting the denominations of virus "A,"

* Reported by the courtesy of Dr. Juan Richelet, Veterinary Adviser in England to the Argentine Republic.

" O " and " C " ; interchange of the virus of one country with another in order to obtain a clear knowledge of those existing in neighbouring countries, investigations in each country in connection with existing viruses and organisation of sanitary services in charge of veterinary surgeons depending directly from respective ministries.

The delegations attending the Conference were composed as follow :—

GERMANY.—Dr. Wehrle, Director of the Health Department of the Reich. Professor Dr. Von Osterlag, Director of Veterinary Services at Tubingen. Counsellor Mussemeir, Director of Veterinary Services of the Prussian Ministry of Agriculture. Professor Dr. Waldmann, Director of the Research Laboratories on the Island of Reims.

ARGENTINE (Listeners).—Dr. Arturo Lanusse, Director General of Livestock, and Dr. Juan E. Richelet, Delegate of the Ministry of Agriculture of the Argentine Republic and Attaché to the Argentine Embassy in London. Dr. Nicolas T. Suarez, Chief of the Inspectorate of Cold Storage Departments.

AUSTRALIA.—Reg. Heywood, Australian Veterinary Delegate in London.

AUSTRIA.—Dr. Casper, Government Counsellor.

BELGIUM.—Inspector General de Roo, Director of Veterinary Services.

BULGARIA.—Dr. Pavloff, Chief of the Veterinary Services.

CYPRUS.—Mr. R. J. Roe.

EGYPT.—Dr. Ibraham Fahnni Salem, Sub-Director of Veterinary Services.

SPAIN.—Professor Santos Aran, Inspector General of Veterinary Services.

FINLAND.—Dr. Vaino Nampaapaa, Member of the Medical Council.

FRANCE.—Professor Vallée, Director of the Veterinary Service Laboratories.

GREAT BRITAIN.—M. J. Jackson, Director of Veterinary Services of the United Kingdom, and D. A. E. Cabot, Inspector-General of same.

GREECE.—Dr. Melahidi, Director of the Laboratory of Veterinary Bacteriologo.

HUNGARY.—Senator Professor Hutyra, Dean of the Faculty of Veterinary Surgery and Professor at Budapest.

INDO-CHINA.—Mons. Le Louet, Inspector of Veterinary Surgery.

IRELAND.—J. H. Norris, Director of Veterinary Services.

ITALY.—Commendadore Carlos Bisanti, Chief of the Veterinary Services of the Directorate of Public Health.

LUXEMBOURG.—Mr. Carlos Krombach, Member of the Chamber of Deputies.

UNITED STATES.—P. G. Short.

MOROCCO.—M. Lessage, Inspector-General of Live Stock.

MONACO.—M. de Menneville, Minister Plenipotentiary in Paris.

NEW ZEALAND.—Colonel Reid.

HOLLAND.—Dr. L. E. Berger, Chief of the Veterinary Services and Dr. Lourens, Director of the Rotterman Laboratories.

POLAND.—Dr. Julian Nowak, Professor at the University of Cracow, and M. Franciszek Fischoeder, Director of the Veterinary Department.

PORTUGAL.—Dr. Aguedo Ferreira, Director of the Laboratory of Veterinary Pathology.

RUMANIA.—M. Jonesco Braila, Director-General of the Department of Zootechnics, and Professor Linca.

RUSSIA.—Professor Pavlovschkoff, President of the Veterinary Scientific Council.

SIAM.—M. Luang Chara, Secretary of Legation.

SWITZERLAND.—Dr. Burgi, Director of the Federal Veterinary Department.

CZECHO-SLOVAKIA.—Counsellor J. Hamr, Chief of the Veterinary Department, and Professor Dr. Sevick, Chief of the National Laboratory.

TRINIDAD.—Cap. Metivier.

TUNIS.—M. Ducloux, Chief of the Cattle Breeding Service.

YUGOSLAVIA.—Dr. Petrovitch, Director of the Veterinary Services.

The scientists who attended this assembly were all in accord in recognising that up to date no system of immunization against the various forms of foot-and-mouth disease could be considered efficient. As regards the polyvalent preventive serum which protects animals for a period of from eight to twelve days, and which is employed in Germany and in Holland, although this was well defended by Waldmann, Ostertag, Berg and Lourens, other delegates argued against it as they considered it gave negative results. The Belgian and Spanish delegates spoke of the tests carried out in their respective countries, and the former stated that in recent international exhibitions Dutch blood stock which had been inoculated two days previously contracted the disease. The Spanish delegate stated that shipments of cows which had been inoculated in Holland, and then transported to Spain, had on arrival at the frontier exhibited the characteristic lesions of foot-and-mouth disease.

During the discussion which arose in connection with the merits of Sero-therapy, the German delegation declared that since 1921 no cases of foot-and-mouth disease had been observed at livestock exhibitions in that country, owing to the fact that the animals used for breeding purposes had been treated with serum prepared at the Reims laboratory. Professors Hutyra, of Budapest, and Burgi, of Berne, declared that in their respective countries no cases had been observed either at shows held during the last 10 years, and the stock in this case had not been submitted to treatment with serum, consequently they were of the opinion that what had occurred in Germany could not be attributed to the action of the serum, but rather to the sanitary inspection measures adopted, which measures were the only ones that held good for combating this disease up to the present.

The vaccine based on formol announced by Vallée was not discussed, and he limited himself to distributing amongst the delegates a printed report, bearing on three cases observed by a veterinary

surgeon in a certain region in France, demonstrating the efficacy of the preparation. He has decided to postpone the discussion until the next conference, which will take place in 1929, so as to have a suitable series of experiments in various parts of the world. Owing to the importance which this point has for the Argentine, we conversed with various of the delegates, Professor Waldmann and Mr. J. Jackson, of the United Kingdom, informing us that although experiments carried out in connection with the preparation of a vaccine in accordance with the method of Professor Vallée, had been successful in the case of guinea-pigs, it had failed with cattle.

The Swiss delegate, Dr. Burgi, read an interesting paper on the evolution of foot-and-mouth disease, confirming all that had been set forth on the failure of all immunizing methods announced up to the present. He maintained that "carrier animals" existed, and mentioned that in isolated regions of Switzerland absolutely free from foot-and-mouth disease, the arrival of healthy animals which a few months previously had been attacked by the disease, caused an outbreak among the cattle in that region, but remained immune themselves. Writer consulted Professors Waldmann and Vallée in connection with the existence of "carriers," but they rejected the theory, their opinion being *that the virus of this disease is very tenacious and exists for long periods in places and products unknown to investigators up to the present.*

At this stage of the discussion the Italian delegate, Commendadore Carlos Bisanti, asked the assembly whether we should really retain the denomination, "Foot-and-mouth disease" rather than "Foot and mouth diseases," considering the considerable number of eruptive diseases the causative agent of which is so far ignored.

The advisability of the Bureau International d'Epizooties, recommending the necessity of each country studying the existing virus or viruses, was also discussed, as also the interchange of the various types, in order to obtain a knowledge of the number of varieties and their geographical distribution.

At the request of Professors Waldmann and Vallée, the suggestion of carrying out statistical work in accordance with commercial practice, in order to complement the laboratory work, was also accepted. Experiments with articles transported from one country to another under normal commercial conditions are indispensable in connection with the study of the disease. The experiments carried out up to date are purely laboratory tests.

As many important points in connection with the combating of this disease remain to be cleared up, they have been left over on the Agenda for the next Conference in 1929, and Professor Waldmann,

of Germany, and Mr. J. Jackson, of the United Kingdom, have been recommended to present at the next meeting a complete report on the tenacity of the foot-and-mouth disease virus, and the length of time it can exist in certain places and objects. At the request of the Australian and Argentine delegations, the programme for the next Conference will include the study of caseous adenitis in sheep, which disease is causing great trouble in the chilled meat trade, and they have been requested to present a paper on the subject.

The Spanish delegate, Professor Santos Oran, was also recommended to present a report on standard certificates in order to be able to arrive at some uniformity in connection with the requirements of the different countries.

At the end of the closing session the Chairman was warmly congratulated on the distinguished work he had carried out at the head of the Bureau International des Epizooties, and for the great success obtained in the organisation of the International Conference.

JUAN E. RICHELET.

OXYGENOTHERAPY IN THE DOG.

By W. R. McKINNA, M.R.C.V.S., D.V.S.M.,
Huddersfield.

FROM perusal of recent articles in our veterinary Press one was led to believe that the use of subcutaneous injections of oxygen in respiratory diseases and especially in distemper was of such value as to be almost a specific. Accordingly, we started out with enthusiasm to apply this panacea for the worst of canine diseases, having due regard to all instructions as to its usage.

Perhaps the long arm of coincidence has been working against us, but after adopting oxygenotherapy in a score of distemper cases, the majority of them being seen in the early stages of the disease, we must confess to disappointment in the results obtained. We have observed no appreciable difference in the duration of an attack of distemper or in its success in treatment when compared with other methods commonly used. The beneficial effect following absorption of the oxygen appears to be very transitory, and we have not found it has warded off or materially alleviated the nervous sequelae.

In the case of respiratory troubles not connected with distemper, it has been found to be of some assistance, and it appears to be of service in cases of so-called "hysteria." Perhaps our experience is an isolated one, but we have found the subcutaneous injections of oxygen but another slight adjuvant in the treatment of canine diseases, and, so far, by no means a specific.

Clinical Articles

An Outbreak of Anthrax.

By SIDNEY VILLAR, F.R.C.V.S.,

On Friday, February 24th last, about 3 p.m., a shorthorn cow in good condition and in milk was observed to be ill whilst in her standing in the cowshed. As her ears were somewhat pendulous, the owner thinking she was attacked with "Blain" (Urticaria), bled her by opening or cutting across a vein in her right ear.

She continued to get worse, and he called Mr. H. Awmack King, M.R.C.V.S., to see her. This gentleman suspected anthrax and the case was reported to the police.

The cow died in her stall at 6.30 the same evening.

I attended later, took a blood smear from a superficial vein and found *B. anthracis* present in large numbers.

The carcass was disposed of in accordance with the provisions of the Anthrax Order 1910.

A young shorthorn cow in good condition and in milk, had shared her stall in the cowshed. The stalls are eight feet wide, so that the occupants stood close together and shared the same manger. This young cow was observed to be licking the blood which escaped when her companion was bled.

She was isolated in a loose box. On the following Sunday morning her temperature was 104·4; she was feeding well, and it was stated there was no shrinkage in her milk yield.

Her temperature was taken once daily, and on each occasion was 105° or slightly over. She continued to feed and milk well, and did not show any marked symptoms except the high temperatures until the following Thursday about noon, when she refused her food. Her temperature was then 107° F., her pulse 90, and respirations 40 per minute.

On Friday morning she was obviously worse, and her temperature had fallen to 100° F.

She died during the afternoon, i.e., on the seventh day after being exposed to infection.

A blood smear taken after her death demonstrated the presence of *B. anthracis*.

It had not been considered advisable to treat her with anti-anthrax serum chiefly, perhaps, because the owner could not be induced to recognise her serious condition.

She was treated with Sodœ Hyposulphis in ℥ii doses, and camphor in oil was given as an injection.

There were about 60 cows on the premises, all kept continuously in the cowsheds and being fed very liberally; artificial cakes, crushed meals and soya beans being included in the diet which was shared by the affected animals.

No further case of anthrax has since occurred on the premises, and no case was known to have occurred on them previous to this outbreak. S.V.

Clinical Notes on Canine Hysteria.

By W. R. McKINNA, M.R.C.V.S., D.V.S.M.,
Huddersfield.

It would appear that such laboratory investigations as have been carried out do not give much information as to the pathology of the disease, and until sufficient data have been gathered, additional notes by the clinician may be of assistance.

Clinical observation certainly classifies the condition as a new type of disease amongst canines, and careful examination of the histories of affected dogs very strongly suggests that the cause is a specific one.

The theory held that some foods or lack of some particular element in the diet is the cause does not explain the incidence of the disease, nor can it be traced to reflex irritation by internal or external parasites. This so-called "hysteria" occurs in dogs free from the latter and in our experience, on all types of diet. We have noted the disease spread throughout kennels in a similar way to that taken by distemper, and one can only explain the spread from dog to dog by the theory of contagion, whatever may be the vehicle. Certainly, in some instances, dogs do appear to escape infection, or, at least, show no abnormalities.

The explanation of the sudden appearance of abject fright in a dog apparently in a normal state of health a moment before is difficult, but it would appear to be due to causes other than physical pain, and reports of *post-mortem* investigations tend to confirm this view in the absence of obvious pathological lesions. An alternative suggestion is that this manifestation of terror is due to some psychic influence, the nervous storm resulting from some specific action on the brain itself by the infective agent, be it virus, bacterium or toxin.

The term "hysteria" is a short and convenient label for this disease, although it is inaccurate, inasmuch as the male is attacked as frequently as the female. A more accurate description, though cumbersome, would be that of a "Specific psycho-neurosis of dogs."

The duration of the disease varies considerably from two or three weeks, to as many months. The dog that overcomes the infection in

the short period appears to become quite normal at the end of this time, and recurrence is not frequent. A more chronic type appears to occur in some cases, however, but the brain storm is not acute or prolonged, chiefly consisting of a short period of restlessness accompanied by a peculiar howl or bark. These attacks may persist over a period of weeks up to three months. In some such instances a marked debilitating effect on the animal's general health has been observed, and there is also a suggestion of a changed mentality of the affected dog. One animal, in particular, became sneaky and deceitful after a previous history of being most boisterous and well behaved.

Treatment with sedatives such as luminal or bromide usually control the nervous condition, whilst at times subcutaneous injections of oxygen appear to be useful. It is absolutely essential, in addition, to give complete quiet, careful observation, and avoidance of all excitement until the disease runs its course.

In view of our lack of knowledge, preventive measures must be on general lines, but we have found isolation, and very thorough disinfection of kennels and all feeding utensils to be of utmost importance.

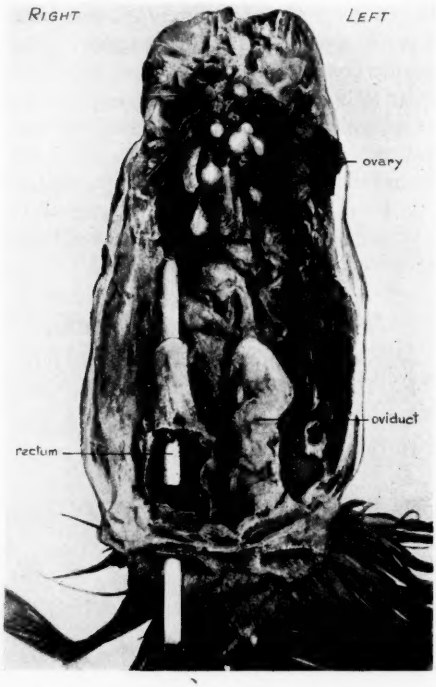
A Hen with Two Vents.

By F. A. E. CREW, M.D., D.Sc., Ph.D.,

Director of the Animal Research Dept., University of Edinburgh.

An adult White Wyandotte hen, remarkable in that she had two ani, was sent to this department for examination and report. The

anal apertures were symmetrically placed, one on either side of the midline and each in its gross anatomy was perfectly formed. By smearing the two with different histological stains it was demonstrated that the perfectly normal eggs which the bird laid invariably passed out of the left anus, whereas the fæces were invariably evacuated from the right one. It was accepted, therefore, that the oviduct of this bird was not associated with the rectum in a common cloaca,



but remained distinct throughout its course and possessed its own external orifice.

Post-mortem examination confirmed this impression. The oviduct was completely normal in histological structure and was peculiar only in that it did not communicate with a cloaca. The rectum was normal histologically, and into it opened the ureters, and the orifice of the bursa Fabricii.

This case is of considerable interest to the comparative anatomist in that it demands a consideration of the nature of the interrelatedness

of the downgrowing Müllerian duct and the ingrowing of the anus. The Müllerian duct as it develops proceeds posteriorly ultimately to open into the cloaca. In this case it would seem that the direction of the growth was unusual, and that instead of deviating so as to meet the rectum in a cloaca it continued its way independently towards the cutaneous structures of the perineum. Two distinct tubes, intestine and oviduct, approached the perineum and against the time of their arrival at the surface invaginations occurred at the points at which they would impinge upon the perineal surface. The influence of an oncoming actively growing tube-tip would seem to be such as to evoke in the area of perineum directly in front of it a response, taking the form of an intense cell activity and under this stimulus an anus is formed. Any area within the limits of the perineum can differentiate into an anus if the appropriate stimulation is exerted during that period of development when such differentiation can occur.

The exact nature of this stimulus is as yet unknown and invites investigation. It may be that a common directing stimulus—chemical or hormonic—guides the growth of downgrowing tube and ingrowing anus, but in view of the work of Gurwitsch the possibility that it is a form of radio-activity on the part of the actively growing tip of the downgrowing tube must be considered.

News

The Faculty of Veterinary Science.*

University of South Africa.

THE Faculty commenced its activities in 1921 and, with a few exceptions, is now more or less fully established. In some respects its curriculum and teaching differ from those of the overseas schools. The training in this country has been adapted to the needs of the stock raising community, and embraces a full consideration of the important conditions peculiar to South Africa. For instance, an extended course in botany is given and incorporates a full discussion of types of veld and poisonous plants. The special training of veterinarians in the Union has been admirably incorporated in the activities of the Veterinary Research Laboratory at Onderstepoort. No less than 15 of its research officers are at present directly concerned with the teaching. This combination of research and teaching has proved to be useful in many respects, and the student from the very beginning is brought into a scientific atmosphere, where he is kept in close contact with the problems of the day.

* From the Journal of the South African Veterinary Medical Association. Vol. I. No. 1.

The following are the degrees in Veterinary Science conferred by the University of South Africa :—

Bachelor of Veterinary Science—B.V.Sc.

Doctor of Veterinary Science—D.V.Sc.

Regulations for the Degree of Bachelor of Veterinary Science.

1. Every candidate for the degree of B.V.Sc. as an internal student, must attend as a registered matriculated student at a constituent college of the University for at least five academic years, unless exempted from part of this attendance on the basis of studies completed at other educational institutions.

2. All candidates shall at some time during their curriculum pass an examination in French or German translation dealing with any of the subjects of the last three years of the curriculum.

3. The curriculum for the degree shall extend over five academic years. In addition evidence of satisfactory vocational practical experience, for such period as may be prescribed by Senate, shall be demanded before graduation.

4. University examinations shall be held in June or December according to the date of termination of the course in the subject concerned. A candidate must have passed in all the prescribed subjects of each year before being admitted to the course of studies of the ensuing year, unless specially exempted by Senate.

5. In addition a supplementary examination shall be held before the commencement of each academic year, in subjects of the second, third and fourth years, if necessary ; in the case of the final year any necessary supplementary examination shall be held in June. A candidate who fails in more than two subjects of the curriculum of any year shall not be entitled to a supplementary examination in the subjects concerned, but shall be required to repeat the curriculum of that year and pass such examinations as may be prescribed by Senate. A candidate who fails in any one subject at the supplementary examination shall be required to undertake such courses and pass such examinations as may be prescribed by Senate.

The Curriculum of the B.V.Sc. Degree is as follows :

First Year.	Second Year.
Botany I	Histology.
Chemistry I.	Embryology.
Physics I.	Chemistry II (organic and physical).
Zoology I.	Botany II and III.

THIRD YEAR.

Veterinary Anatomy III (Comparative and Topographical).
Biochemistry II.
Physiology II.
Pathol. Physiology.
Bacteriology.
Pathology I (General).
Pharmacology.
Economic Entomology.
Zootechnics.
Hygiene I.
Biochemistry I.
Physiology I.
Veterinary Anatomy I and II (Systemic).

FOURTH YEAR.

Hygiene II.
Pathology II (Special).
Infectious Diseases I.
Medicine I.
Surgery I.
Helminthology.
Clinic.

FIFTH YEAR.

Infectious Diseases II.
Medicine II.
State Veterinary Medicine.
Municipal Veterinary Hygiene.
Surgery II.
Obstetrics.
Clinic.
Pathology III (*post-mortems*).

Regulations for the Degree of Doctor of Veterinary Science.

1. Any Bachelor of Veterinary Science of the University of not less than four years' standing, or any person admitted to the status of Bachelor of Veterinary Science in the University who has held the qualification by virtue of which such admission was granted for a period of not less than four years, or alternatively, any Bachelor of Veterinary Science of not less than two years' standing, of which at least one year has been devoted entirely to research work at an institution approved of by the Senate of the University, will be allowed to present himself as a candidate for the Degree of Doctor of Veterinary Science.

2. Any candidate holding a recognised foreign degree or diploma of sufficient standing may present himself for admission to the status of B.V.Sc. in the University of South Africa, provided that, if required by the Senate, the candidate shall complete such further work and pass such examination as may be prescribed, and such admission *ad eundem statum* shall entitle a candidate to offer himself for the degree of D.V.Sc., in terms of these regulations.

3. Every candidate for the degree of D.V.Sc. shall be required to present, for the approval of the Senate, a thesis or dissertation dealing with some subject connected with Veterinary Science provided that,

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if required by the Senate, the candidate shall also pass such examination as may from time to time be determined.

No thesis or dissertation shall be accepted, which does not show either original research undertaken by the candidate, or an advance on the current treatment of the selected subject.

4. The degree of D.V.Sc. may be conferred *honoris causa* for labours in the cause of Veterinary Science.

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1925.—Quin, J. I.; Bergh, M.; Bisschop, J. H. R.; Green, W. J. B.; Mare, C. v. E.; Martinaglia, G.; Snyman, P. S.; Williams, J. G.

1926.—Alexander, R. A.; Bekker, J. G.; Daly, L. L.; Lawrence, D. H.; Allchurch, W. B.; Cooper, V.; Graf, H.; Lund, H. E.; Marais, I. P.; Shulz, K.

1927.—Coles, D.; Dickson, J. L.; Flight, C.; Mönnig, H. O.; Reid, J.; Starke, N. C.; Thomas, H. D.

All these graduates have received positions in the Government Service of the Union.

The D.V.Sc. Degree was conferred *honoris causa* in 1925 on Sir Arnold Theiler, K.C.M.G.

Professor Dr. B. Bang's 80th Birthday.*

(OUR congratulations to Prof. Bang, of Denmark, formerly Principal of the Copenhagen Veterinary School, on having attained his 80th birthday, and a sincere wish from his English colleagues that he may be spared and enjoy good health for many years to come.)

The festivities were carried out in brilliant sunshine, and were of a most cheerful and successful nature.

Dr. Bang, surrounded by his family, received endless congratulations from friends and colleagues far and near; together with letters, telegrams, flowers and gifts of various kinds. Many students from colleges and institutions came in person to bring their good wishes.

Prince Valdemar and several Ministers of State sent telegrams; Prof. Ellinger, Director of the High School, was present, and Prof. Martin Knudsen, Rector of the University, brought congratulations from his students and from the various scientific societies. The Medical Faculty

* Translated from the *Maaredzaskrigt fur Dyrlaege*, 15 Juini. (F. M.)

was represented by the Physician-in-Chief, Dr. Olaf Thomsen; the Medical Society and Finsen Light Institute by Dr. Reyn; the State Serum Institute by Dr. Thos. Madsen; and the Carlsberg Laboratory by Prof. S. P. L. Sörensen.

Members of the Veterinary Sanitary Council, together with their Secretary, were present, and Veterinary Sanitary Inspector, Dr. C. O. Jensen, offered the aged President good wishes on behalf of the members and employés of the Council.

Staff Veterinary Surgeon Dr. St. Friis brought good wishes in the name of the Army Veterinary Corps. A committee, under the presidency of Dr. Paulli, carried out a short programme, arranged in honour of the day, with the assistance of the masters, assistant masters and former pupils of the High School..

The Danish Veterinary Society, with their President, Dr. G. Gautier, as spokesman, offered a tribute of lovely flowers to Dr. Bang. The Veterinary Surgeons of Zeeland were separately represented by V. Sr. Gram, who presented in their name a gift, accompanied by beautiful flowers. Finally we may mention the greetings of the Soran Society, conveyed by Staff Surgeon Dr. Norrie; and a number of personal good wishes from Dr. Bang's own colleagues.

Prof. Hedelin, from Alnarp, brought an address of congratulation from the Swedish Veterinary Association; and District Veterinarian Borg, as representing the Skanien Veterinary Association, brought a beautiful tribute of flowers.

Prof. von Ostertag brought congratulations from the German Veterinary Surgeons, and presented Dr. Bang with a Diploma, creating him an honorary member of the Würtemburg Veterinary Society, together with an address from the professors on the staff of the Berlin High School. Prof. Poppe, from Rostock, conveyed the greetings of the Veterinary Society of Mecklenburg.

Dr. Bang had invited as many of his relations and friends as his house would contain to a dinner party in the evening; and it was late on into the night when the octogenarian received the last of the many speeches and tokens of goodwill sent him from the crowds of well-wishers.

All who were present that evening will remember the cheerful, wonderful feast and the aged, clear minded, Professor—who acknowledged, in so bright and happy a spirit, all the homage so generously offered him on his 80th birthday.

Reviews

Tuberculous Intoxications: Concealed and Masked Tuberculosis. By Joseph Hollos. Price 10s. 6d. E. & S. Livingstone, Edinburgh. 1928.

This is an enlargement of the author's first book, which, published in 1909, was awarded the Audiffred prize by the Académie de Médecine of Paris in 1911. The earlier edition was presented to the French medical world by the late Professor Antonin Poncet, whose commendatory preface is reproduced, pointing out that working by different paths Dr. Hollos had arrived at conclusions which confirmed those of himself and Leriche ("La tuberculose inflammatorie," Paris, 1912).

Throughout 100 pages the author, who is pathologist at St. Vincent's

Hospital, New York, discusses the meaning of the various manifestations of tuberculous intoxication, and illustrates his argument with cases from his own practice. Prognosis receives but a brief account, followed by a chapter, illustrated with temperature charts, describing the application of Spengler's immune blood treatment. References to the literature quoted and a conveniently arranged index end a well-printed and attractively produced little book of some 142 pages.

Whether the present monograph will meet with a better reception than its predecessor of 18 years ago is questionable. The author contends "that in the majority of cases tuberculosis does not present itself in the manifest customary form, but remains concealed and has the appearance of anæmia, neurasthenia, thyrosis, hysteria, epilepsy, neurosis, rheumatism, dysmenorrhœa, neuralgia, rachitis tarda, etc." These manifestations of tuberculous intoxication (latent tuberculosis or concealed tuberculosis) are regarded "partly as the result of disturbances in the individual organs" (i.e. the site or sites of quiescent lesions of tuberculosis), "but, for the most part they are caused indirectly, through injuries affecting the endocrine glands." That is to say, the toxins of his own tubercle bacilli produce chronic inflammatory changes in the patient's endocrine system as described originally by Poncet and Leriche, the initial tuberculous focus remaining quiescent or progressing very slowly owing to the immunity acquired by the patient. Thus, the author argues, the intensity of the toxæmic symptoms, i.e. the anæmia, neurasthenia, rheumatism, etc., become an index of the degree of immunity acquired; and consequently the greater the severity of such symptoms the better the prognosis.

Such a thesis, lacking a clearly defined pathological basis, requires the consideration of medical clinicians; and, it is to be hoped too, the consideration of veterinary clinicians as well.

An Elementary Text-Book of General Microbology. By WARD GILTNER. J. & H. Churchill, London. 1928. Price 15s.

PROFESSOR WARD GILTNER, of the Department of Bacteriology and Hygiene, Michigan State College, U.S.A., has within 444 pages presented a survey of the "biology of the small forms of life (bacteria, filterable viruses, fungi, and protozoa)" in the form of an elementary text-book.

The book comprises five chapters (69 pages) on morphology and cultivation, five chapters (53 pages) on physiology, nine chapters (129 pages) on the microbes of air, water, sewage, soil, milk, food, and industrial products, two chapters (31 pages) on infection and immunity, eight chapters on the pathogenic microbes, bacteria 73 pages, filterable viruses 18 pages, fungi 15 pages, and protozoa 21 pages; with a final chapter of 20 pages discussing the microbial diseases of plants. The remainder of the book is occupied by a subject index, and by a well-written introduction, which with the aid of a chronological table enables the student to gauge the history of his science. The letterpress is illustrated with 99 photographs, drawings, or charts, the majority of which have been abstracted from other works.

The author appears to have indicated the motive for his labour in the following sentence abstracted from his preface. "The following chapters were written with the object of making the subject as understandable as possible to the college sophomore, regardless of his previous curriculum." Thus Professor Ward Giltner desires the student to gain an introduction

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to his course of bacteriology by reading 444 pages; whereas in England one or two introductory lectures are sufficient for the student to correlate his new study with the basic sciences. To call upon the present-day student of human or veterinary medicine, already overloaded with an ever-expanding curriculum and literature, to purchase and assimilate yet another text-book argues more for the advocate's enthusiasm than for his sense of humour. However, it is not suggested that Professor Giltner's book is an unnecessary addition to scientific literature; it will form a very useful addition to the library of a teaching institution. The student during his first term's work in bacteriology would derive advantage from a few evenings' reading, especially of its introductory chapters. The chapters on infection and immunity are especially well written, and lose nothing by their brevity.

Like many books of a now familiar type, it is too elementary for use by students as their standard text-book, and far too extensive and expensive as an introductory brochure. This weakness of the book is apparent in its treatment of the bacterial and protozoal infections. In attempting to give equal prominence to so many species under each genus, the author has been forced to compress his description into an inadequate catalogue of properties, making difficult and uninspiring reading. The procedure gives rise to such meaningless statements under the anaerobes as "acid and gas are produced in many carbohydrates." The novitiate would obtain a more comprehensive notion of the organisms if their generic properties were more fully described, and mention of the species differences relegated to small type.

Students in this country may find some difficulty over the nomenclature, since, as yet, our teaching has not fully adopted the recommendations of the 1920 Report of the Committee appointed by the American Society of Bacteriologists. The book would have been more acceptable to the English student had the author, who has followed the American classification, included the familiar names for each genus and species. Our student is unprepared for Mycobacterium tuberculosis, Clostridium chauvei, or Escherichia coli. To describe the filterable viruses as "ultrasomes" is unnecessary pedantry.

Several descriptive errors may not escape the author's attention when preparing a subsequent edition. On page 362 Johne's bacillus is described as the causative factor of Scrapie in English sheep; on page 348 Bacillus chauvei is regarded as "only a possible and not an actual pathogen of sheep and goats." We are also unable to subscribe to the statement that potassium iodide "may serve as a confirmatory diagnostic test" for actinomycosis. There is a printer's error on page 267, to read "treponema pallidium."

Criticism must also be directed against a number of the illustrations. The majority of them are either poorly reproduced, or, as in those of organisms and cultures, are inadequately described, particularly for novitiates. Finally, there is considerable support for the reviewer's belief that many American authors irritate their English readers by the phonetic mis-spelling of the English language. Even though the author retorts by claiming diarrhea, flavor, fetus, colored, etc., as of his own tongue, the English reader's irritation gives way to a prayer that the Society of American Bacteriologists may well issue instructions upon "English as she is spelt."—T. H.

Obituary

Professor Edgar M. Crookshank, J.P., M.D.

THE Profession, and especially the graduates of the London College, have lost a good friend by the sudden and unexpected death of Professor Crookshank, the senior Vice-President of the Board of Governors, and Chairman of the Building and Appeal Fund Committee. It will be recollected that we published a brief biography, together with a photograph, of Mr. Crookshank in THE VETERINARY JOURNAL.

Although a medical man he took an intense interest in the welfare of the veterinary profession, and for 40 years he had rendered inestimable service to veterinary education and research. One of the greatest wishes of his life was to see the London College rebuilt and equipped in a manner which would make it worthy of England, and no man worked harder than he did for this end.

Born in 1858 he showed a taste for scientific work at a very early age, and became a pupil of Professor Ray Lankester at University College, London, obtaining a science exhibition at King's College, and eventually gaining another exhibition and the gold medal in anatomy at the University of London, where he took the degree of M.B. with honours. During the Egyptian War he was selected for special duty in antiseptic surgery and was present at the battle of Tel-el-Kebir. His experience in the field being of sufficient value to make his services requested to give evidence on the antiseptic methods employed at the field and base hospitals of the expedition before the Royal Commission of Services in Egypt.

After studying bacteriology under Pasteur in Paris and Koch in Berlin, he was appointed Professor of Bacteriology in King's College, where he founded the first laboratory to be established in England for instruction in bacteriology and comparative pathology. To these classes the veterinary student was as welcome as the student of human medicine, and his " Manual of Bacteriology " was the standard work of that time, so much so, that it was also published in America and translated into French. He identified himself again with the study of comparative pathology by a series of articles on " Actinomycosis " and " Vaccination." For the former he received the thanks of the Privy Council. He was elected a Fellow of King's College, and the Royal Agricultural Society thought so much of his services that they elected him a Member of Council.

After retiring from an active life in medical science he entered politics, contesting the East Grinstead Division of Sussex. Although not successful in becoming a member of Parliament, he was well known on the Bench as a county magistrate. Fond of travel, he was a great sportsman, and his home at East Grinstead contains many trophies of big game which had fallen to his gun in South Africa and elsewhere.

His knowledge of the shortcomings of facilities for veterinary education in this country, as compared with our Continental neighbours, made him throw himself wholeheartedly into any scheme which gave promise of assisting our profession in this direction, and it is hard to think why, just on the verge of fulfilment of a very much long-felt want, he should have been called away.

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Errata.

Page 284. Article by Messrs. W. L. Little, F.R.C.V.S., T. Skene Keith, M.B., and H. T. Fawns, B.Sc. Line 2. For "hypoglycæmia" read "hyperglcæmia."

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